U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION II
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MEMORANDUM

TO: Steve Cipot - Project Manager
ERRD/NJRB

FROM: Andy Crossland - Geologist
ERRD/PSB/TST

DATE: Tuesday, June 6, 2000

SUBJECT: Review of recent documents for the L.E. Carpenter site, including the following: 3 letters dated May 15, 2000, *Evaluation of Remediation of Groundwater by natural Attenuation*, and *Free Product Modeling Report*, L.E. Carpenter, Wharton, New Jersey.

In response to your request, I have reviewed the document listed above. If you have any questions concerning these comments, please feel free to call me at x4436.

May 15, 2000 Letter Re: NJDEP Review of the MW19/Hotspot 1 Area Remedial Investigation Report:

1. The letter contends that delineation of the area is complete. This is based on the conclusion that groundwater flow is heavily influenced by the presence of the interceptor sewer along Ross Street. To support the argument, groundwater contours are presented in an attached figure 1. Although it is possible that the interceptor trench has an effect on flow direction, the presentation and conclusions are largely conjectural. The sharp turn in flow direction indicated on the figure is largely based on water levels in MW-19-8 and MW-19-7, which are the same. This is not sufficient data to rule out possible flow which continues to the north.

   Furthermore, if the sewer line is acting as a preferred pathway for groundwater flow, it is also likely a preferred pathway for contaminant transport. If, as is claimed, groundwater flow is controlled by the fill around the sewer line, contaminants would likely be migrating along that pathway and may not be apparent in MW-19-8. Subsequently, the previous comments on delineation stand and an additional well is still needed.

2. The need for vertical delineation also remains. The floating behavior of LNAPL does not

apply to dissolved phase contaminants. Furthermore, although one point has shown an upwards gradient, this does not preclude the possibility that contaminants are present at greater depths or that the vertical gradient persists at all times. The hypothetical vertical distribution of contaminants needs to be confirmed with a downgradient well.

May 15, 2000 Letter Re: Free Product Remedial Alternative Analysis

1. The proposal to conduct a focused feasibility study for augmenting LNAPL recovery is an important next step. In evaluating in situ oxidation options (such as Fenton's Reagent), it will be important to recognize that these technologies have a strong negative impact on biodegradation, which RTM is proposing for the dissolved phase of the plume. Also, EPA suggests that technologies which would enhance the percentage of NAPL recovered should also be considered as part of the FSS (eg. heating, flushing...).

May 15, 2000 Letter Re: Lead Hot Spots B and C

1. As I believe has been stated previously, attempts to tie the lead contamination to mining activities need to be more fully supported. Is there concrete evidence that the mines or mining spoils were located exactly at the site? All information as to the location of these activities needs to be fully and coherently presented. Merely stating that mining took place in the general vicinity is not sufficient evidence. In addition, background lead levels for the area need to be fully documented if the presence of lead is argued to be intrinsic to the area.

2. Regardless of the source, high levels of lead in the shallow soils present a hazard that must be addressed. The full extent of contamination needs to be delineated. It is not clear why this effort, now proposed, was not completed as planned in the previous field work. As stated in previous comments, data on the full extent of contamination should be presented with calculations of the amount of impacted soil so that removal can occur. If the extent of contamination is shown to be prohibitive of a "dig and haul" remedy, alternative can then be considered. The present data do not suggest that this is the case; the assumption should be that the selected remedy will be implemented unless new data conclusively proves that it is not best remedy.

Evaluation of Remediation of Groundwater by Natural Attenuation

1. Natural attenuation data presented in the report suggest that the aquifer in the LNAPL area has become anaerobic as a result of biodegradation. It seems likely that the aquifer was initially aerobic, but that oxygen and other electron acceptors were depleted by biological activity. Currently, in the LNAPL area, very little degradation is likely occurring. However, as contaminants migrate out of the anaerobic area beneath the LNAPL, conditions become aerobic and degradation is likely to be active. Subsequently, the system can be conceptualized as active degradation on the perimeter of the plume, with little or no degradation in the area under the LNAPL.

2. As a result of the above dynamics, the extent of the plume is likely controlled by the location of the aerobic-anaerobic boundary - and not by the actual flow of groundwater.

3. The bioscreen modeling should be viewed largely as an academic exercise and not as an

accurate representation of site conditions. First of all, the model assumes that degradation is occurring at a single rate along the flow path. As noted above, degradation is likely occurring only at the fringe of the plume. Also, the inputs to the model are largely based on literature values and general assumptions, not on site specific characteristics.

4. On pages 7-5 and 7-6, a number of calculations are made of the percent of contaminants which have been degraded. These figures are based on an assumed high source input and a resulting assumed high degradation rate to produce the current extent of the plume. It is not valid to use these inputs to determine that high percentages of the contaminant mass has been degraded.

5. With the above in mind, it does appear that biodegradation has effectively contained the plume or kept it to very slow expansion rates. The rate of expansion may be most easily studied by examining changes in the concentration of natural attenuation parameters at wells along the periphery of the plume. Have the oxygen and ORP values at MW-22 and MW-25 decreased with time? If natural attenuation processes were to be accepted as the means of remediation, the time frame for clean up would likely be most controlled by the extent of source removal and the supply of oxygen in the aquifer. Efforts to increase source removal are to be addressed in a pending FSS document. It seems reasonable to consider enhancing the oxygen content of the aquifer as a possible, effective alternative to pump and treat. This could be done as pilot work in tandem with measures designed to enhance source removal.

Free Product Modeling Report

1. The calculations in the report apear to follow the estiamtion methods and give a reasonable estimate of the amount of LNAPL present. As pointed out in the report, all estimates of this sort have large error bars and the final numbers need to be evaluated accordingly.